MEMORANDUM

STATINTL

Date: July 30, 1962

To:

From:

Subject: Synchronization of Reader and Printer Lens Carriages.

Regarding our conversation of 27 July, we have enclosed our findings on the above subject. You are well aware of the conditions listed below which affect synchronization of Reader and Printer lens carriages during active scan. These conditions are as follows:

1. Compatibility of tape rate and incremental position information with a given Printer lens carriage speed.

2. Compatibility of tape starting rate and position information with the static and/or dynamic parameters of the "X" scan servo system.

Assuming correct tape rate and incremental position information, the lock-in time of the two carriages is dependent upon such variables as static friction, damping and gain of the Reader lens carriage servo system with respect to a given Printer lens carriage speed.

Correct tape information implies the necessary rate and position at start of scan to minimize lock-in time when considering the above scan servo variables, Printer lens carriage speed and enlargement ratio. Lock-in time can most readily be minimized by change of "X" scan servo gain and damping and if necessary change of tape first check block position information. The latter change is by trial and error means at present and can be quite cumbersome if degree of lock-in time is variable and excessive over a long rectification tape. An alternate correction is computer reprogramming, that is, inserting a variable scan rate with its compatible position information which would comply more readily with fixed or limited "X" scan servo parameters. At present, the adjustment of "X" scan servo gain and velocity feedback plus minimum change of tape first check block position information has been adequate to minimize lock-in time.

The degree of minimization required is dependent upon the Reader lens carriage starting scan position and the actual size of Reader film. For example, if the starting position of the Reader lens carriage is far removed from the edge of Reader film, considerable lock-in time (8 check blocks) can be tolerated before Reader film information is read. However, out of lock condition will still exist on the print out if lock in occurs after the Reader lens carriage is over the Reader platen transparent bow tie area. However, this out of lock condition can be readily eliminated from the print out by masking the transparent bow tie area not covered by Reader film. If the Reader lens starting scan position and required film reading position are in close proximity one of the above mentioned steps is required for lock in time correction. Declass Review by NIMA/DOD

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Some new tapes were evaluated when the Photo Rectifier systems were being demonstrated. Our evaluation time was limited; however, a 2 to 1 nadir enlargement rectification tape was made to perform satisfactorily on both systems. Without servo gain and damping correction the above lock in time was around twelve check blocks. After servo gain was decreased and damping changed the lock-in time was reduced to around five to six check blocks. No change of tape position information in first check block was required. The Reader lens carriage starting position was outside the platen transparent bow tie area and lock-in was achieved prior to the lens carriage being over the bow tie area. Therefore, no masking of the transparent bow tie area was required to obliterate non-lock in condition on print out. The Printer FAST -SLOW switch was on FAST position during the rectification.

The lock in condition of a 1 to 1 nadir enlargement rectification tape was also corrected in the same manner. However, we did have several oblique tapes in which the tape rate and position information were not compatible.

The crossover point between tape rate and position information and Printer lens carriage speed is at a 2 to 1 enlargement condition. The above information should help you analyze and remedy any excessive lock in condition that may exist in your system (Unit No. 2). I am sure that further progress in this and other problem areas will be obtained through direct contact at the SPIE show.

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